

0034114



## Department of Energy

Richland Operations Office  
P.O. Box 550  
Richland, Washington 99352

December 27, 1993

94-RPS-072

Mr. David B. Jansen  
State of Washington  
Department of Ecology  
P.O. Box 47600  
Olympia, Washington 98504-7600

Dear Mr. Jansen:

HANFORD FACILITY DANGEROUS WASTE PART A PERMIT APPLICATION FORM 3, REVISION 4,  
FOR THE PLUTONIUM-URANIUM EXTRACTION PLANT (WA7890008967) (TSD: TS-2-6)

Enclosed is the Hanford Facility Dangerous Waste Part A Permit Application (Part A) Form 3, Revision 4, for the Plutonium-Uranium Extraction (PUREX) Plant. The PUREX Plant is located in the 200 East Area of the Hanford Facility. This Part A was revised to include two of four areas supporting PUREX Plant deactivation activities: (1) sugar denitration, and (2) minimization of liquid waste by concentration. The other two areas, (3) greater-than 90-day storage of in-plant liquid waste and (4) treatment of plutonium and uranium waste solutions in Tanks D5 and E6, will be addressed through negotiated Hanford Federal Facility Agreement and Consent Order Milestones.

This Part A has been revised to change the process description for sugar denitration in Tanks F15 and F16 to include additional sources of acid waste. The Part A also has been revised to change the process description for the F11 Concentrator to include different sources of in-plant liquid waste.

This Part A revision is needed to proceed with PUREX Plant deactivation efforts and subsequent closure. Details of this revision are specified in the enclosed Form 3 permit application explanation (Enclosure 1).

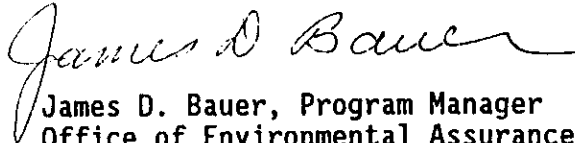


Mr. Jansen  
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-2-

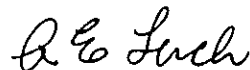
Should you have any questions regarding the PUREX Part A, Revision 4, please contact Mr. C. E. Clark, U.S. Department of Energy, Richland Operations Office, on (509) 376-9333 or Mr. R. C. Bowman, Westinghouse Hanford Company, on (509) 376-4876 .

Sincerely,



James D. Bauer, Program Manager  
Office of Environmental Assurance,  
Permits, and Policy  
DOE Richland Operations Office

EAP:CEC




R. E. Lerch, Deputy Manager  
Restoration and Remediation  
Westinghouse Hanford Company

Enclosure:  
Plutonium-Uranium Extraction Plant  
Waste Part A Permit Application  
Form 3, Revision 4

cc w/enclosure:  
D. L. Duncan, EPA  
T. M. Michelena, Ecology  
D. C. Nylander, Ecology  
Administrative Records, H6-08

cc w/o enclosure:  
D. R. Butler, Ecology  
J. M. Atwood, Ecology  
R. C. Bowman, WHC  
R. E. Lerch, WHC  
S. M. Price, WHC



Please print or type in the unshaded areas only  
(fill-in areas are spaced for elite type, i.e., 12 character/inch).

<b>FORM</b> <b>3</b>	<b>DANGEROUS WASTE PERMIT APPLICATION</b>	1. EPA/STATE I.D. NUMBER <div style="border: 1px solid black; padding: 2px; text-align: center;">           W A 7 8 9 0 0 0 8 9 8 7         </div>					
<b>FOR OFFICIAL USE ONLY</b>							
APPLICATION APPROVED	DATE RECEIVED (mo., day, & yr.)	COMMENTS					
<b>II. FIRST OR REVISED APPLICATION</b>							
Place an "X" in the appropriate box in A or B below (mark one box only) to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA/STATE I.D. Number, or if this is a revised application, enter your facility's EPA/STATE I.D. Number in Section I above.							
<b>A. FIRST APPLICATION</b> (place an "X" below and provide the appropriate date)							
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input type="checkbox"/> 1. EXISTING FACILITY (See instructions for definition of "existing" facility. Complete item below.)           </div> <div style="width: 45%;"> <input type="checkbox"/> 2. NEW FACILITY (Complete item below)           </div> </div>							
<div style="border: 1px solid black; padding: 2px; text-align: center;">             MO. DAY YR.              01 15 56           </div>	FOR EXISTING FACILITIES, PROVIDE THE DATE (mo., day, & yr.) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED (use the boxes to the left)	<div style="border: 1px solid black; padding: 2px; text-align: center;">             MO. DAY YR.              . . . . .           </div> FOR NEW FACILITIES, PROVIDE THE DATE (mo., day, & yr.) OPERA- TION BEGAN OR IS EXPECTED TO BEGIN					
<b>B. REVISED APPLICATION</b> (place an "X" below and complete Section I above)							
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <input checked="" type="checkbox"/> 1. FACILITY HAS AN INTERIM STATUS PERMIT           </div> <div style="width: 45%;"> <input type="checkbox"/> 2. FACILITY HAS A FINAL PERMIT           </div> </div>							
<b>III. PROCESSES - CODES AND CAPACITIES</b>							
<b>A. PROCESS CODE</b> - Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process (including its design capacity) in the space provided on the (Section III-C).							
<b>B. PROCESS DESIGN CAPACITY</b> - For each code entered in column A enter the capacity of the process.							
<b>1. AMOUNT</b> - Enter the amount.							
<b>2. UNIT OF MEASURE</b> - For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.							
<b>PROCESS</b>	<b>PRO- CESS CODE</b>	<b>APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY</b>					
<b>Storage:</b>							
CONTAINER (barrel, drum, etc)	S01	GALLONS OR LITERS					
TANK	S02	GALLONS OR LITERS					
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS					
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS					
<b>Disposal:</b>							
INJECTION WELL	D80	GALLONS OR LITERS					
LANDFILL	D81	ACRE-FEET (the volume that would cover one acre to a depth of one foot) OR HECTARE-METER ACRES OR HECTARES					
LAND APPLICATION	D82	GALLONS PER DAY OR LITERS PER DAY					
OCEAN DISPOSAL	D83	GALLONS PER DAY OR LITERS PER DAY					
SURFACE IMPOUNDMENT	D84	GALLONS OR LITERS					
<b>UNIT OF MEASURE</b>							
GALLONS	G	LITERS PER DAY					
LITERS	L	TONS PER HOUR					
CUBIC YARDS	Y	METRIC TONS PER HOUR					
CUBIC METERS	C	GALLONS PER HOUR					
GALLONS PER DAY	U	LITERS PER HOUR					
<b>UNIT OF MEASURE CODE</b>							
<b>EXAMPLE FOR COMPLETING SECTION III (shown in line numbers X-1 and X-2 below): A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.</b>							
N U M B E R	A. PRO- CESS CODE (from list above)	<b>B. PROCESS DESIGN CAPACITY</b>	FOR OFFICIAL USE ONLY	N U M B E R	A. PRO- CESS CODE (from list above)	<b>B. PROCESS DESIGN CAPACITY</b>	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G	5	S 0 2	600	G
X-2	T 0 3	20	E	6	T 0 3	20	E
1	T 0 1	103,600	U	7	T 0 1	103,600	U
2	S 0 2	21,000	G	8	S 0 2	21,000	G
3	S 0 5	565	Y	9	S 0 5	565	Y
4	T 0 4			10	T 0 4		

Continued from the front.

III. PROCESSES (continued)

C. SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESS (code "T04"). FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

The following are treatment and storage processes for the Plutonium-Uranium Extraction (PUREX) Plant, located in the 200 East Area.

TO1 Tank E5 [5,000 gallon (19,000 liter) design capacity] - mixed waste is treated with NaOH and NaNO<sub>2</sub> before sending the waste to the Double-Shell Tank (DST) System.

The concentrator [F11; 2,600 gallon (9,800 liter) design capacity] - Ammoniacal mixed waste was processed in the concentrator with the ammonia distillate going to the 216-A36B Crib before September 1987. From September 1987 to PUREX Plant shutdown in March 1990, ammoniacal waste was collected in tank G7 [15,000 gallon (57,000 liter) design capacity] and treated with NaOH and NaNO<sub>2</sub> before being transferred to the DST System. During PUREX Plant deactivation, the F11 concentrator will be used to minimize the volume of liquid waste sent to the DST System by evaporation of water from flush solutions (both regulated and nonregulated) with the distillate (nonregulated) being discharged to the atmosphere via the PUREX main stack (291-A-1). The concentrate generated in the F11 concentrator is treated with NaOH and NaNO<sub>2</sub> in tank F18 [5,000 gallon (19,000 liter) design capacity] or TK-G7 [15,000 gallons (57,000 liter) design capacity] before transfer to the DST System. On occasion, the F11 concentrator may be used to evaporate sugar denitrated waste from tanks F15 and F16. Tank-G7 also will be used to treat flush and other waste solutions before transferring them to DST during deactivation.

Tanks F15 and F16 [each tank has a 5,000 gallon (19,000 liter) design capacity] - The mixed waste is denitrated using sugar and may be sent to the F11 concentrator for volume reduction. Residual liquids will be treated with NaOH and NaNO<sub>2</sub> in tanks F15, F16, or F18 before being transferred to the DST System. The process design capacity for all treatment vessels is 103,600 gallons (392,000 liters) per day.

TO1, SO2 Tank F18 [5,000 gallon (19,000 liter) design capacity] and tanks U3 and U4 [each with a 8,000 gallon (30,000 liter) design capacity] - The mixed waste is collected from all sections of the PUREX Plant (E-F11 bottoms, other vessels, sumps, sinks, drains, overflows, laboratory waste) and treated with NaOH and NaNO<sub>2</sub> before being transferred to the DST System. The process design capacity for tank treatment is 103,600 gallons (392,000 liters) per day and the process design capacity for tank storage is 21,000 gallons (79,500 liters).

SO5 The designation SO5 (storage miscellaneous) has been used to indicate that the solid mixed waste on the canyon deck is stored in a containment building subject to the requirements of 40 CFR 265, Subpart DD. The solid waste consists of radioactive contaminated discarded canyon process equipment and jumpers (or isolated components thereof) containing lead and/or cadmium used as weights, counterweights, or radiation shielding. The process design capacity of the storage area on the canyon deck is 565 cubic yards (403 cubic meters).

IV. DESCRIPTION OF DANGEROUS WASTES

- DANGEROUS WASTE NUMBER** - Enter the four digit number from Chapter 173-303 WAC for each listed dangerous waste you will handle. If you handle dangerous wastes which are not listed in Chapter 173-303 WAC, enter the four digit number(s) that describes the characteristics and/or the toxic contaminants of those dangerous wastes.
- ESTIMATED ANNUAL QUANTITY** - For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non-listed waste(s) that will be handled which possess that characteristic or contaminant.
- UNIT OF MEASURE** - For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS .....	P	KILOGRAMS .....	K
TONS .....	T	METRIC TONS .....	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:

For listed dangerous waste: For each listed dangerous waste entered in column A select the code(s) from the list of process codes contained in Section III to indicate how the waste will be stored, treated, and/or disposed of at the facility.

For non-listed dangerous wastes: For each characteristic or toxic contaminant entered in Column A, select the code(s) from the list of process codes contained in Section III to indicate all the processes that will be used to store, treat, and/or dispose of all the non-listed dangerous wastes that possess that characteristic or toxic contaminant.

Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code(s).

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: DANGEROUS WASTES DESCRIBED BY MORE THAN ONE DANGEROUS WASTE NUMBER - Dangerous wastes that can be described by more than one Waste Number shall be described on the form as follows:

- Select one of the Dangerous Waste Numbers and enter it in column A. On the same line complete columns B, C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
- In column A of the next line enter the other Dangerous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
- Repeat step 2 for each other Dangerous Waste Number that can be used to describe the dangerous waste.

EXAMPLE FOR COMPLETING SECTION IV (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE	A. DANGEROUS WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES	
				1. PROCESS CODES (enter)	2. PROCESS DESCRIPTION (if a code is not entered in D(1))
X-1	K 0 5 4	300	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2			T 0 3 D 8 0	included with above

Continued from page 2.  
NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

I.D. NUMBER (entered from page 1)

W A 7 8 9 0 0 0 8 9 8 7

IV. DESCRIPTION OF DANGEROUS WASTES (continued)

LINE NO.	A. DANGEROUS WASTE NO. (enter code)				B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES							
	1. PROCESS CODES (enter)						2. PROCESS DESCRIPTION (if a code is not entered in D(1))							
1	W	T	0	1	66,000,000*	P	T01	S02					Treatment - Chemical/	
2	W	T	0	2									Storage - Tank	
3	W	C	0	1										
4	W	C	0	2										
5	W	P	0	1										
6	W	P	0	2										
7	D	0	0	1										
8	D	0	0	2										
9	D	0	0	3										
10	D	0	0	4										
11	D	0	0	5										
12	D	0	0	6										
13	D	0	0	7										
14	D	0	0	8										
15	D	0	0	9										
16	D	0	1	0										
17	D	0	1	1		↓	↓	↓					Included with above	
18	W	T	0	1	5,300*	P	S05						Storage - Containment Building	
19	D	0	0	6										
20	D	0	0	8		↓	↓						Included with above	
21														
22														
23														

\* The estimated annual quantities of wasted listed above represent the maximum quantities of solid dangerous waste currently treated and stored at the PUREX Plant. Future closure activities might necessitate an increase in excess of these estimates and a permit application revision could be pursued as required by dangerous waste regulations.

Continued from the front.

IV. DESCRIPTION OF DANGEROUS WASTES (continued)

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM SECTION D(1) ON PAGE 3.

Tank E5 contains (1) decladding waste consisting of  $\text{NH}_4\text{F}$ ,  $(\text{NH}_4)_2\text{ZrF}_6$ ,  $(\text{NH}_4)_2\text{UF}_6$ , and  $\text{NH}_4\text{NO}_3$ ; (2) metathesis solutions consisting of  $\text{KOH}$  and  $\text{KF}$ ; or (3) metathesis rinse and miscellaneous flushes with similar chemical makeups. All streams are treated with  $\text{NaOH}$  to a pH greater than 12, which consists mainly of  $\text{NaF}$ ,  $\text{KF}$ ,  $\text{UO}_2$ ,  $\text{ZrO}_2$ ,  $\text{NH}_3$ ,  $\text{NH}_4\text{OH}$ , and  $\text{NaNO}_3$ . During deactivation and terminal cleanout, waste and flush solutions will be treated to obtain a pH greater than 12 and  $[\text{NO}_2]$  greater than 0.011 molar before transferring the waste to storage.

The concentrator (F11) bottoms, containing  $\text{NH}_4\text{NO}_3$  and  $\text{NH}_4\text{OH}$  or nitric acid or denitrated solution, are transferred to tank F18 or tank G7 and treated with  $\text{NaOH}$  and  $\text{NaNO}_2$ .

Tanks F15 and F16 contain acid waste with  $\text{HNO}_3$  and possibly  $\text{Al}(\text{NO}_3)_3$ , which is treated with sugar,  $\text{NaOH}$ , and  $\text{NaNO}_2$ .

Tank F18 and tanks U3 and U4 receive miscellaneous waste with a constantly changing composition consisting mainly of water and  $\text{HNO}_3$ . All waste is treated with  $\text{NaOH}$  and  $\text{NaNO}_2$  to a pH greater than 12.

The PUREX Plant containment building holds discarded equipment that contain elemental lead and/or elemental cadmium, which is regulated as a solid waste because of the toxicity of the lead and/or cadmium.

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility (see instructions for more detail).

VI. PHOTOGRAPHS

All existing facilities must include photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas (see instructions for more detail).

VII. FACILITY GEOGRAPHIC LOCATION

This information is provided on the attached drawings and photos.

LATITUDE (degrees, minutes, & seconds)

LONGITUDE (degrees, minutes, & seconds)

VIII. FACILITY OWNER

☒ A. If the facility owner is also the facility operator as listed in Section VII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER

2. PHONE NO. (area code & no.)

3. STREET OR P.O. BOX

4. CITY OR TOWN

5. ST.

6. ZIP CODE

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (print or type)  
John D. Wagoner, Manager  
U.S. Department of Energy  
Richland Operations Office

SIGNATURE

DATE SIGNED

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

NAME (print or type)

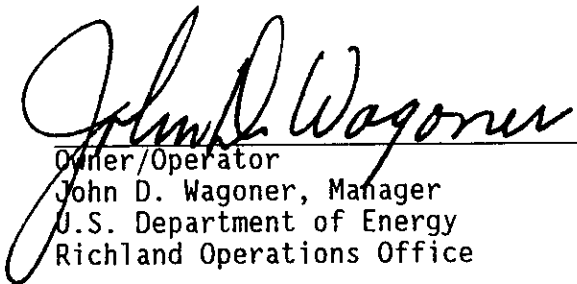
SIGNATURE

DATE SIGNED

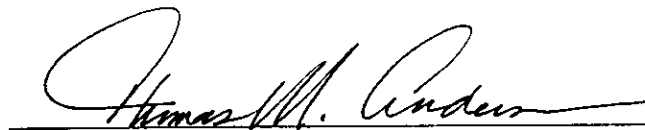
SEE ATTACHMENT

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

  
\_\_\_\_\_  
Owner/Operator  
John D. Wagoner, Manager  
U.S. Department of Energy  
Richland Operations Office

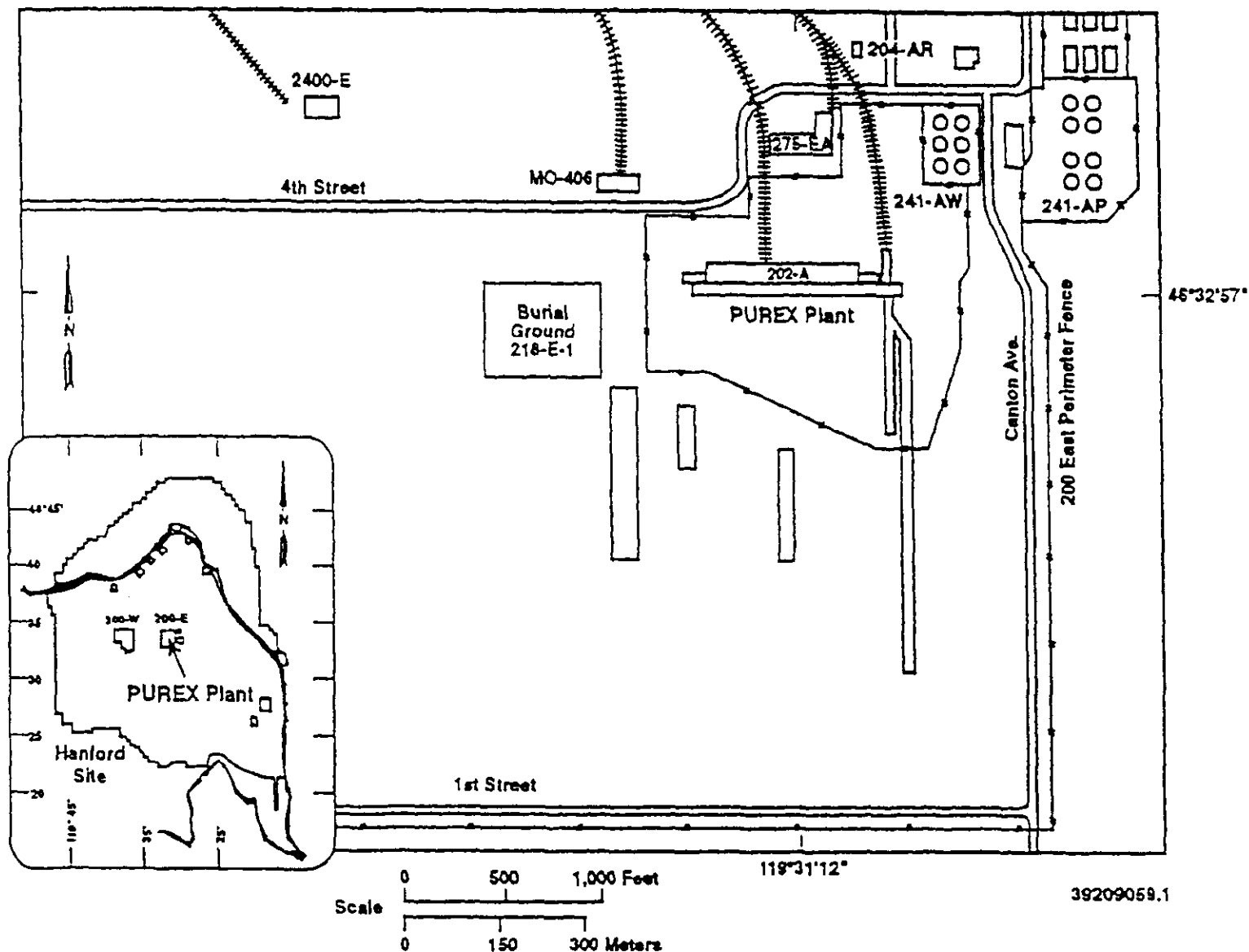
12/22/93  
Date

  
\_\_\_\_\_  
Co-operator  
Thomas M. Anderson, President  
Westinghouse Hanford Company

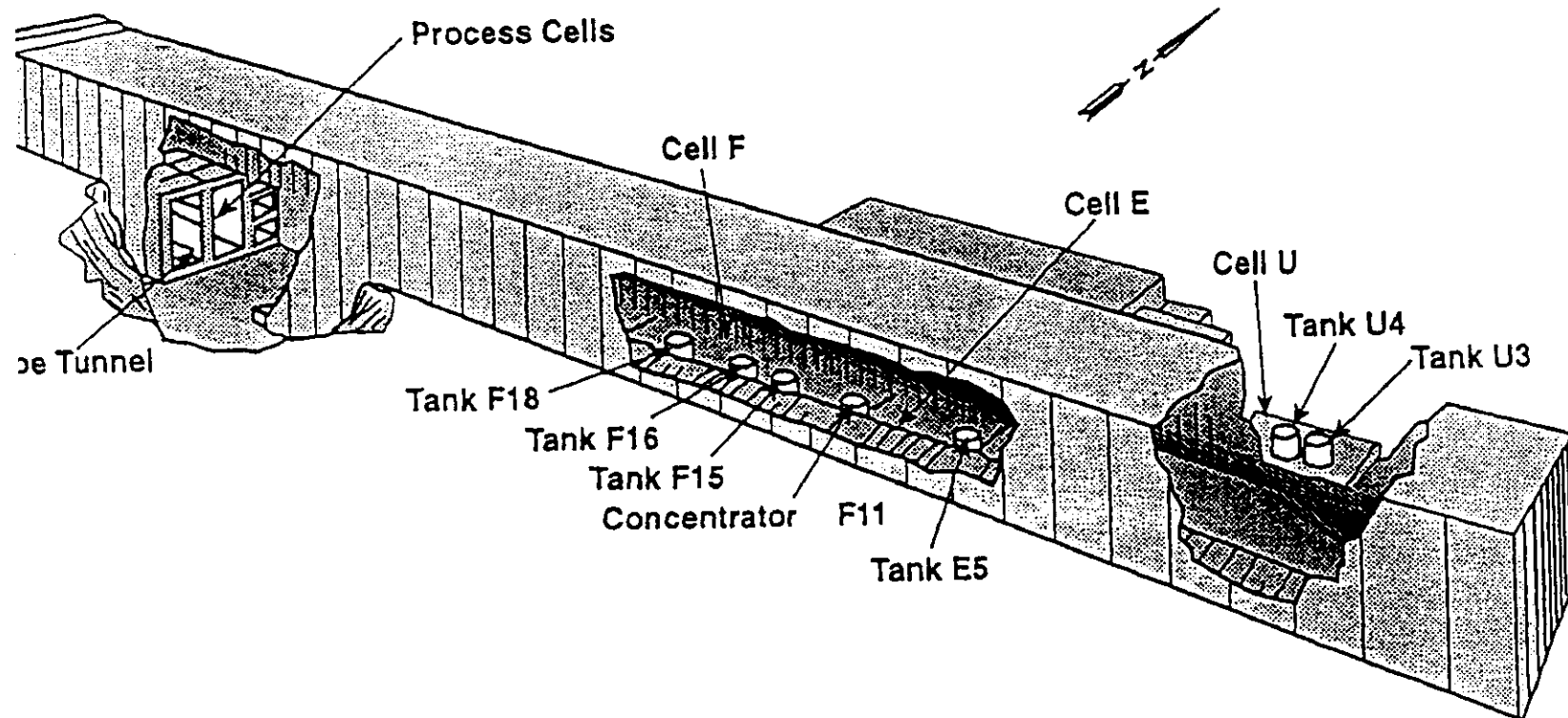
12/1/93  
Date



# PUREX Plant Site Plan

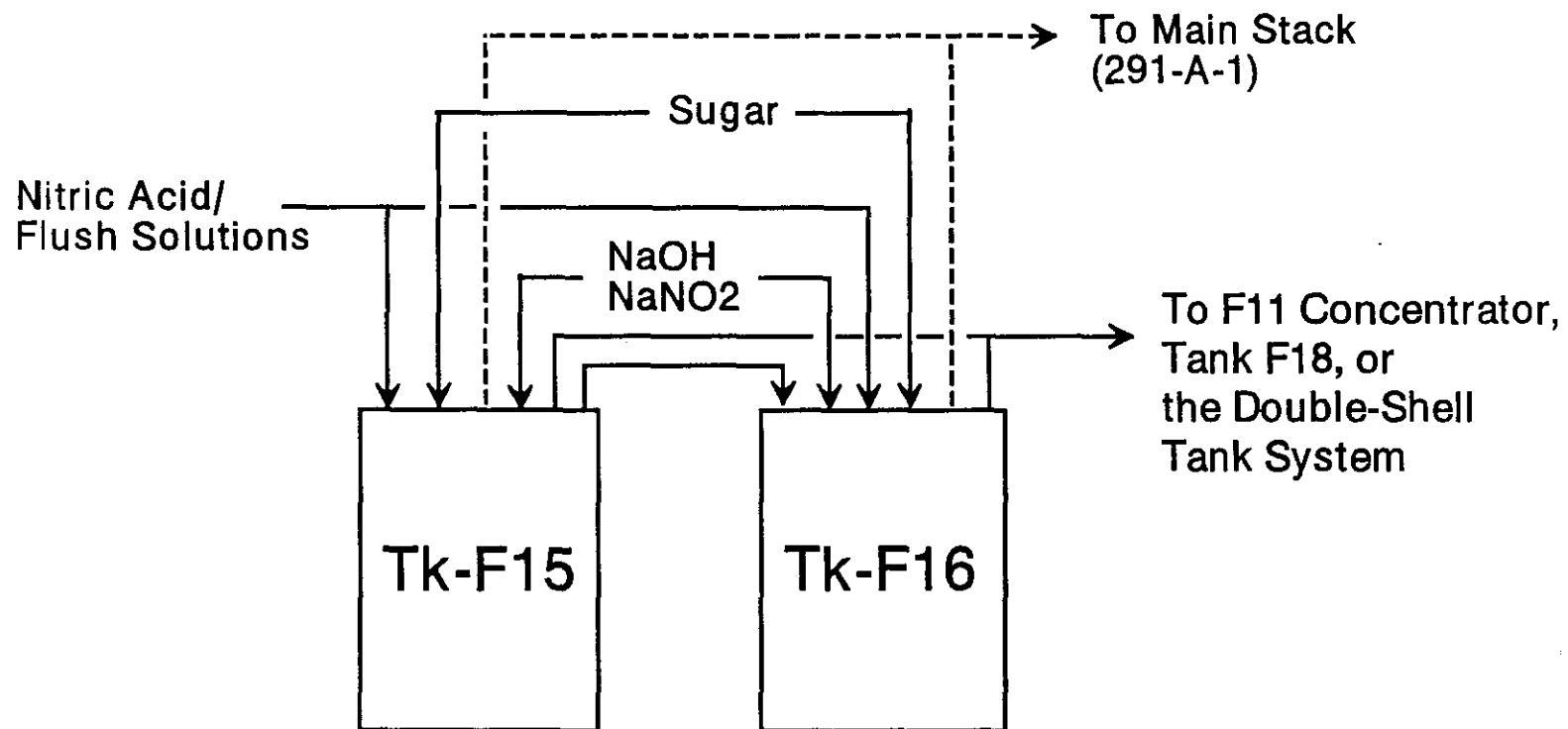


# PUREX Plant Cutaway View (202-A Building)

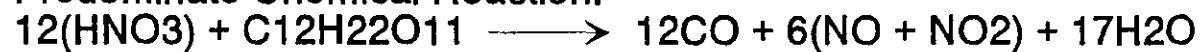


39201061.7

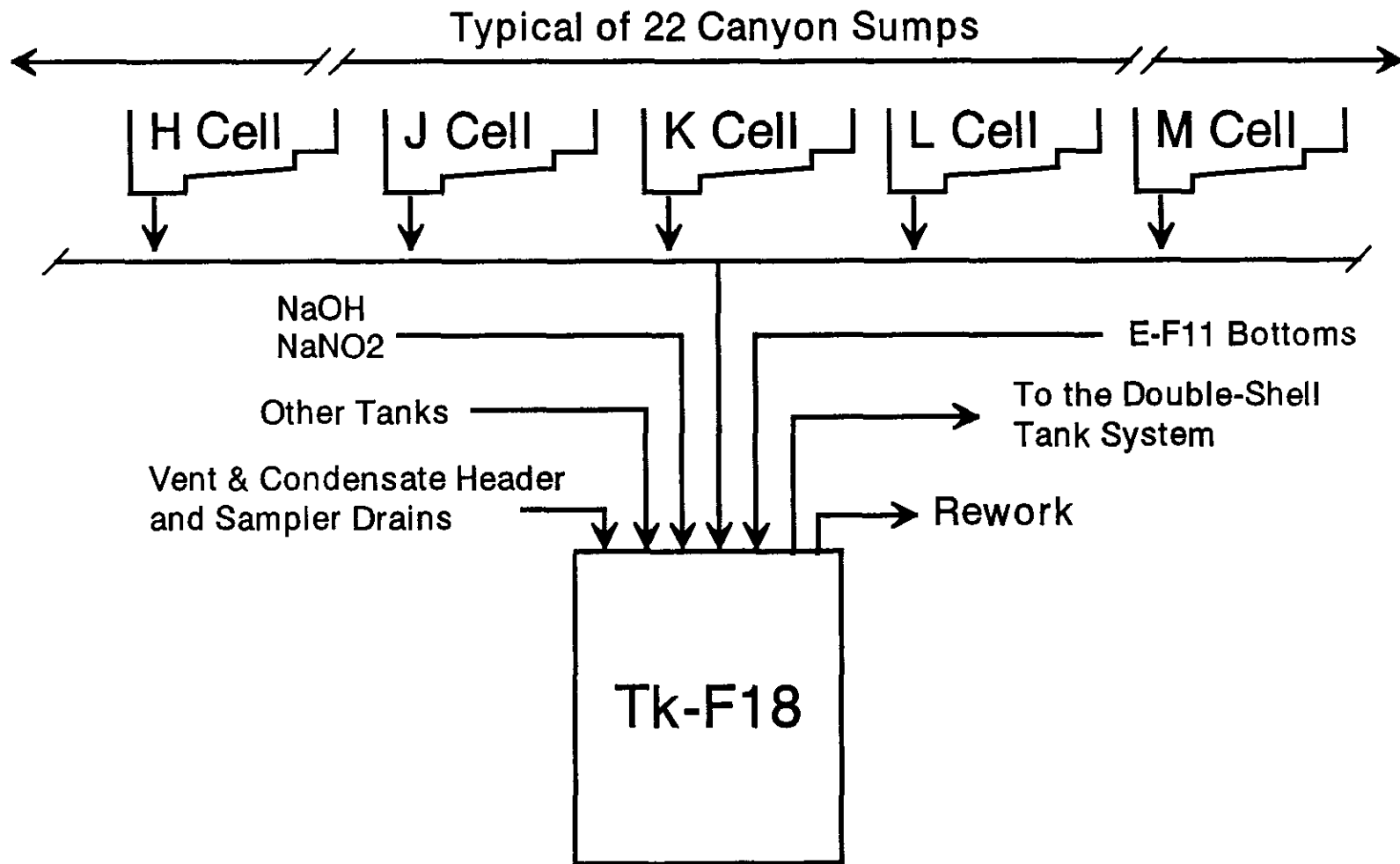
## Tanks F15 and F16 Sugar Denitration Waste Stream Flow Diagram



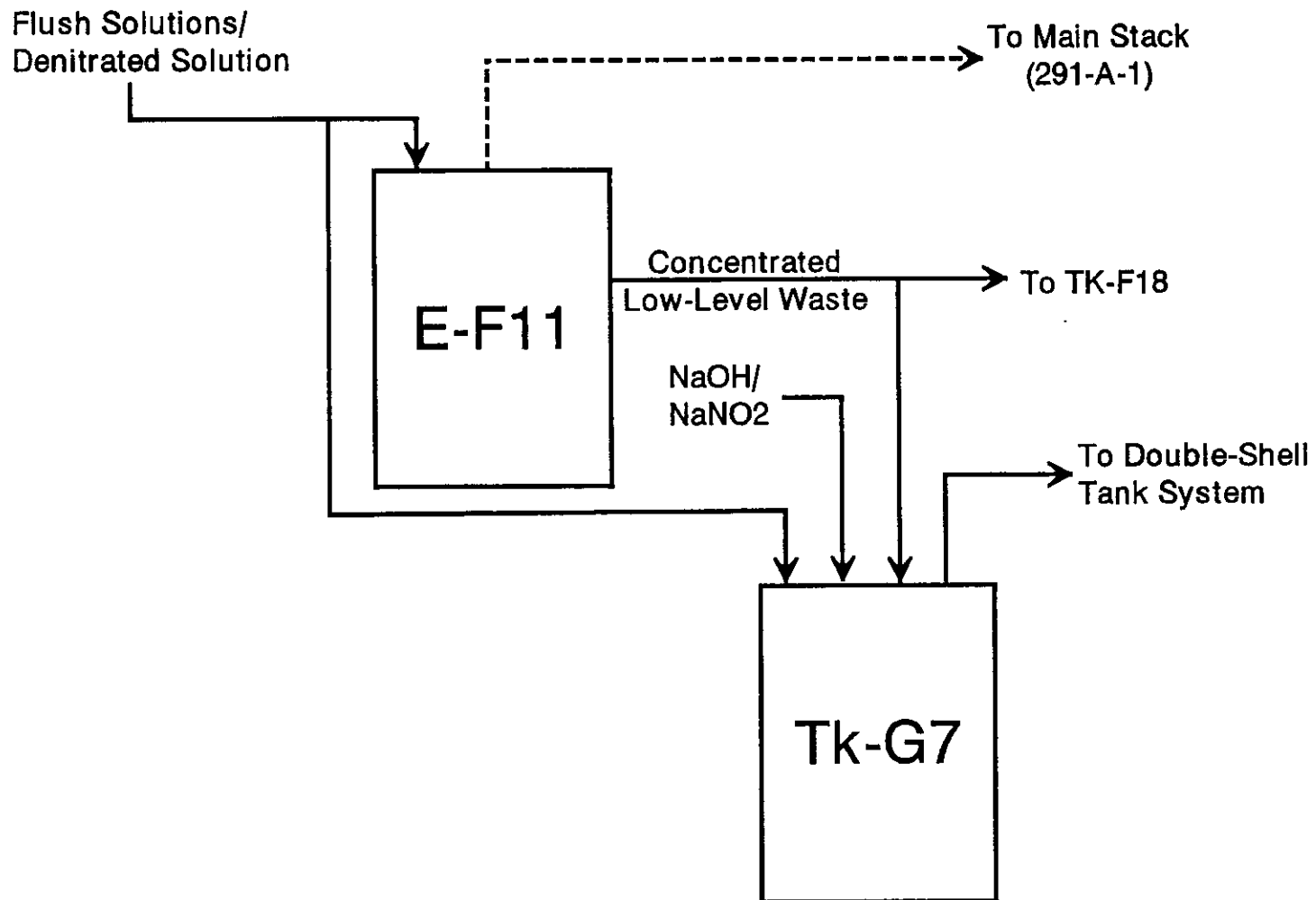
Predominate Chemical Reaction:



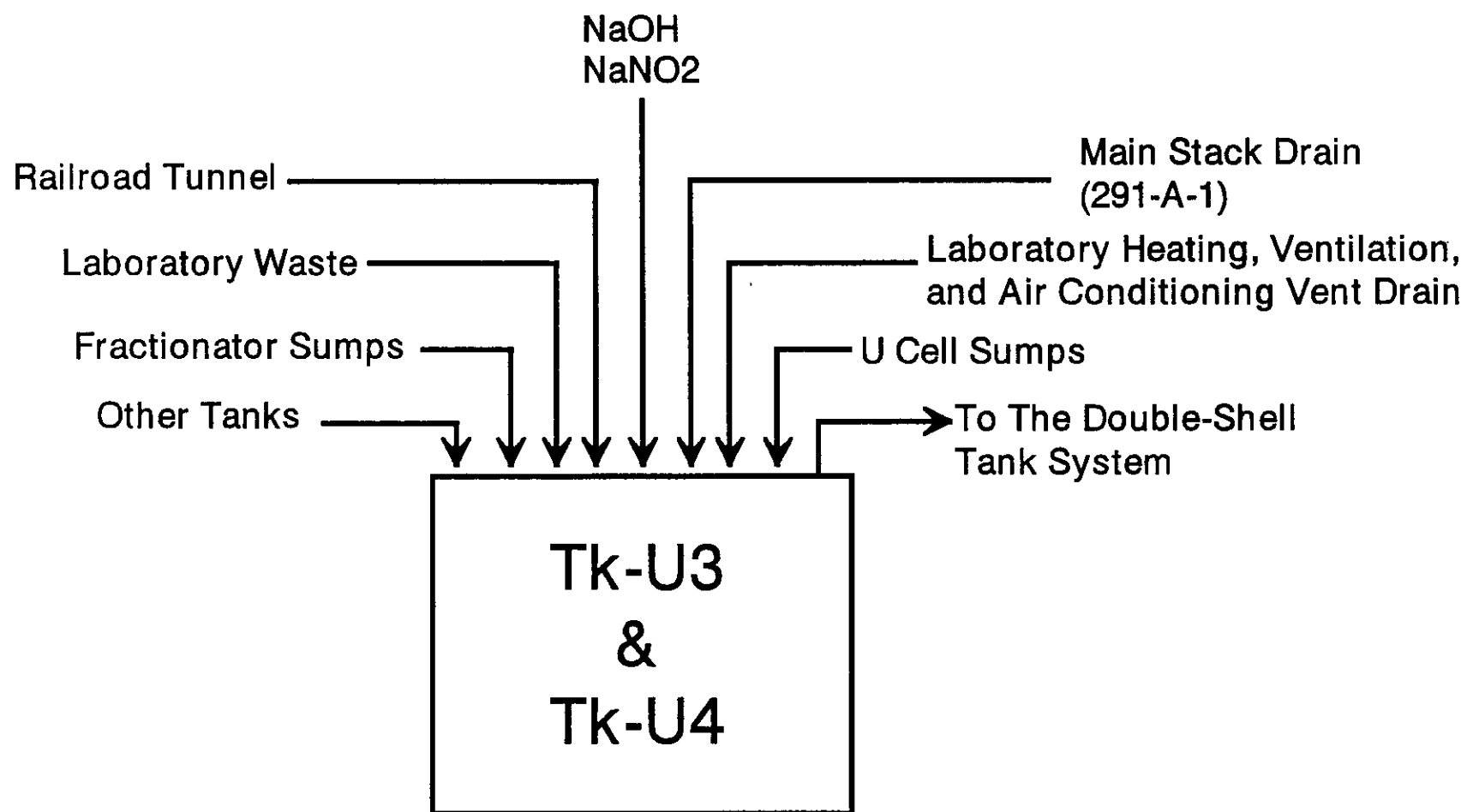
## Tank F18 Waste Stream Flow Diagram



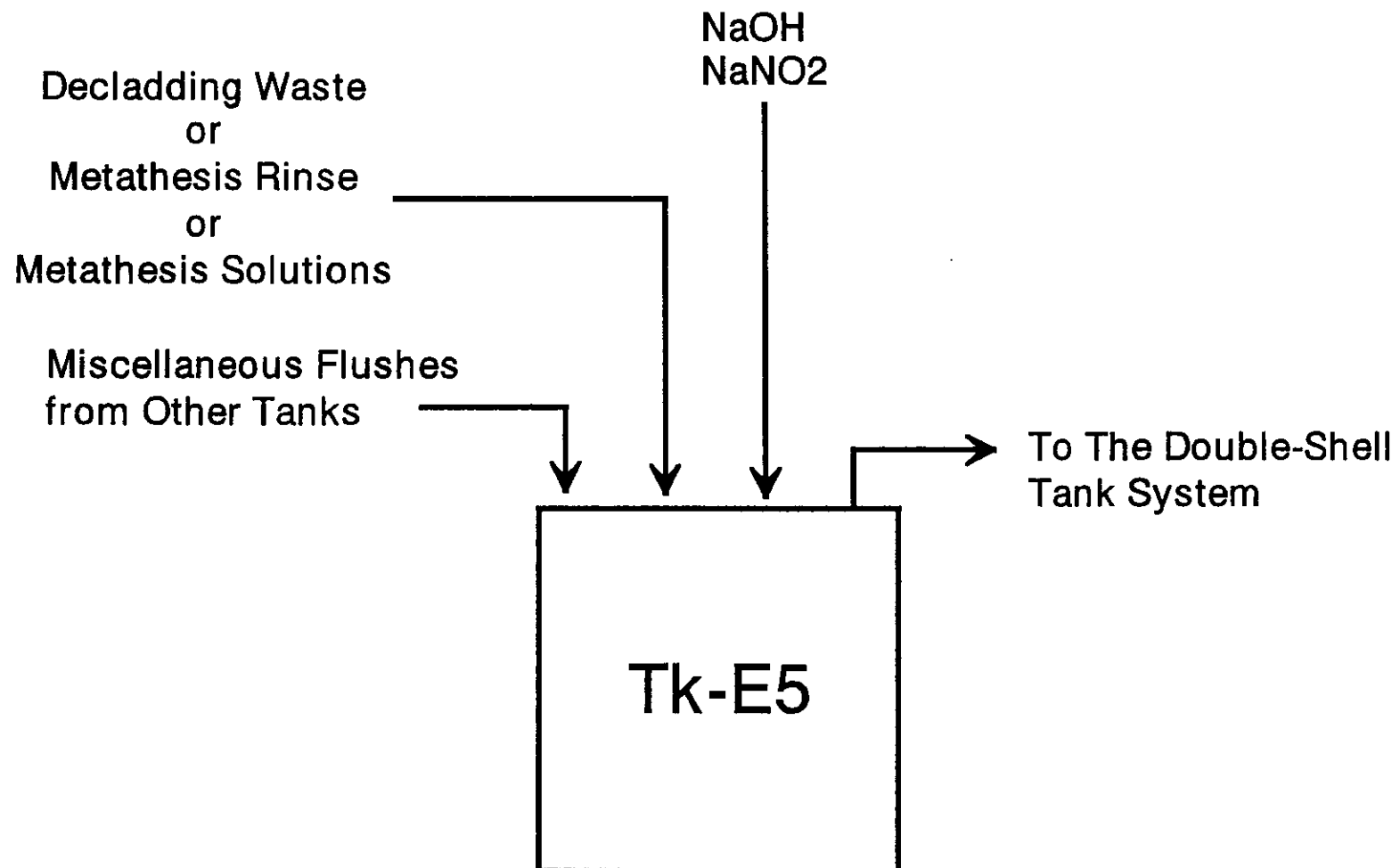
## Tank G7 and Concentrator F11 Waste Stream Flow Diagram



## Tanks U3 and U4 Waste Stream Flow Diagram



# Tank E5 Waste Stream Flow Diagram



## PUREX PLANT (SOUTH SIDE)

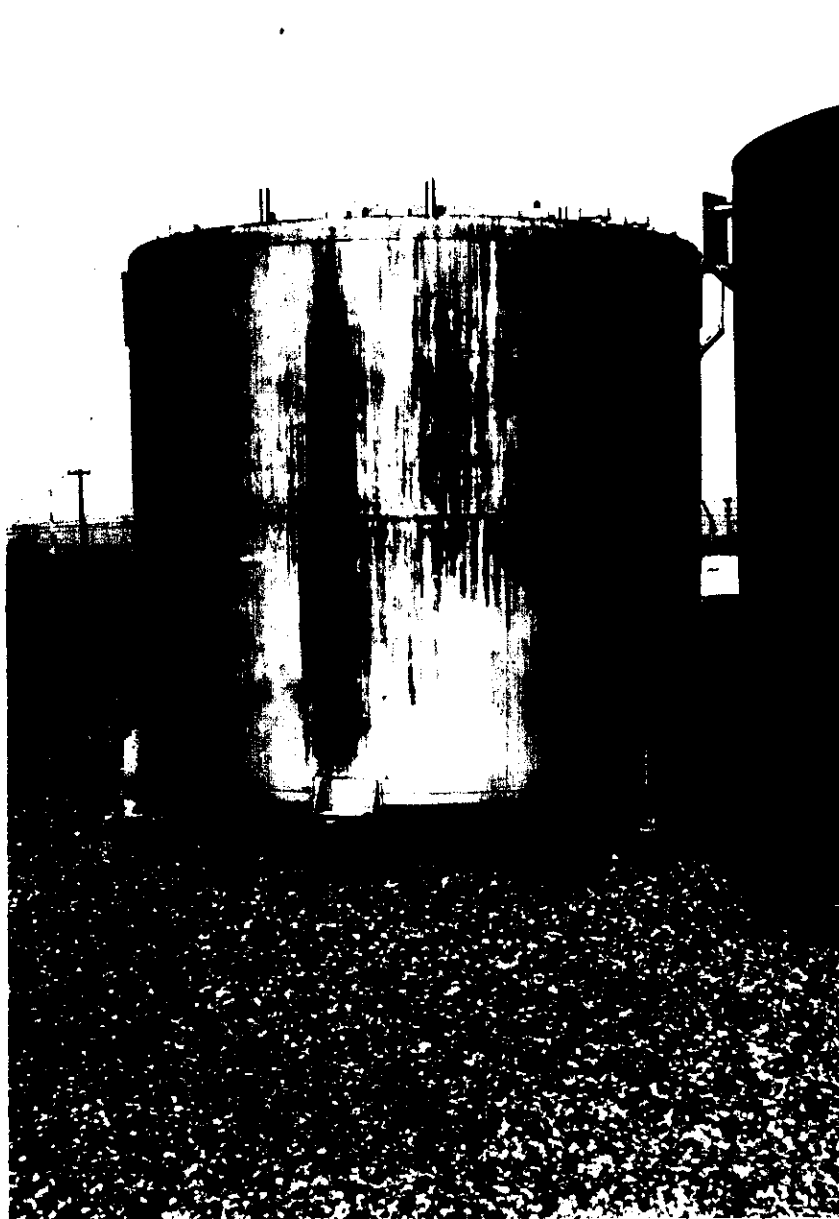


46°32'57"  
119°31'12"

8706243-4CN  
(PHOTO TAKEN 1987)



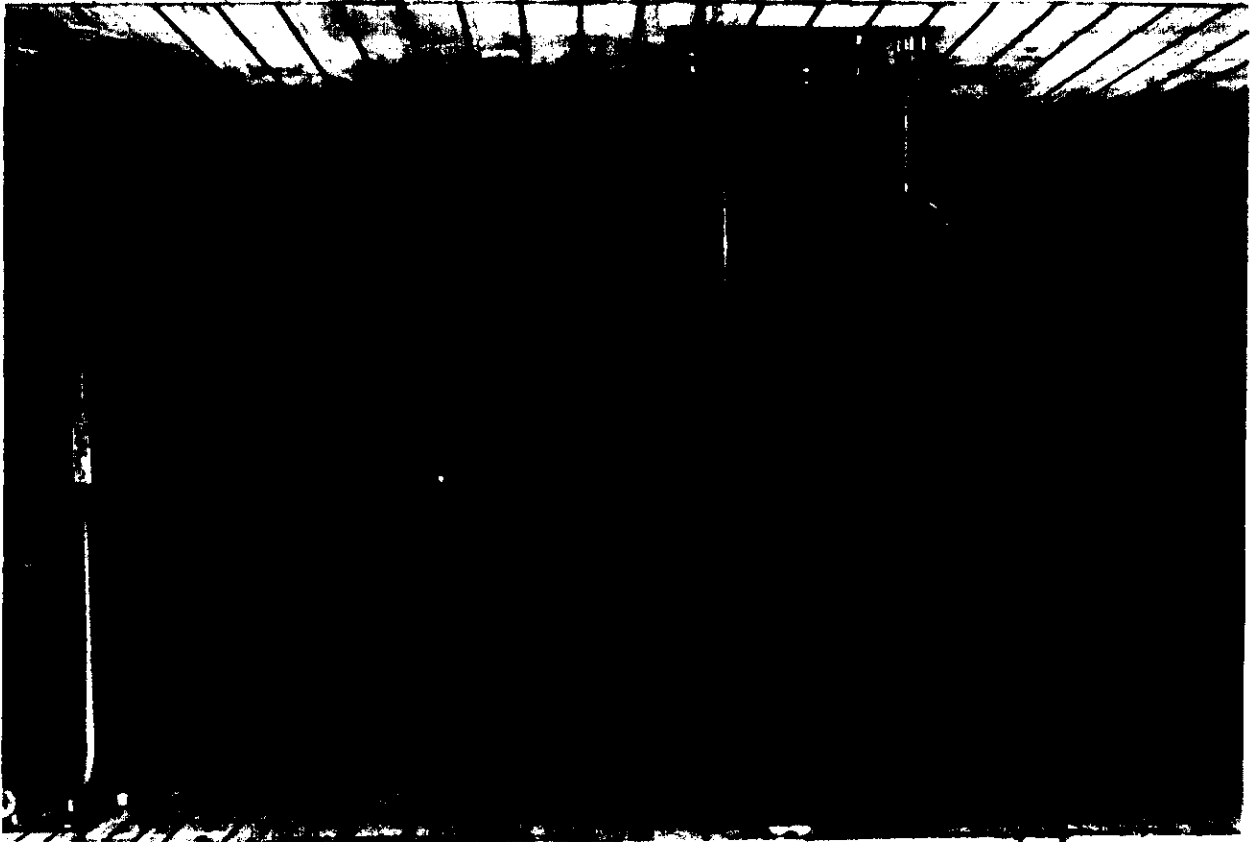
## **STANDARD 5,000-GALLON TANK (TYPICAL OF E5, F15, F16, AND F18)**



8706243-5CN  
(PHOTO TAKEN 1987)

## TANK E5

Pipe Tunnel Wall

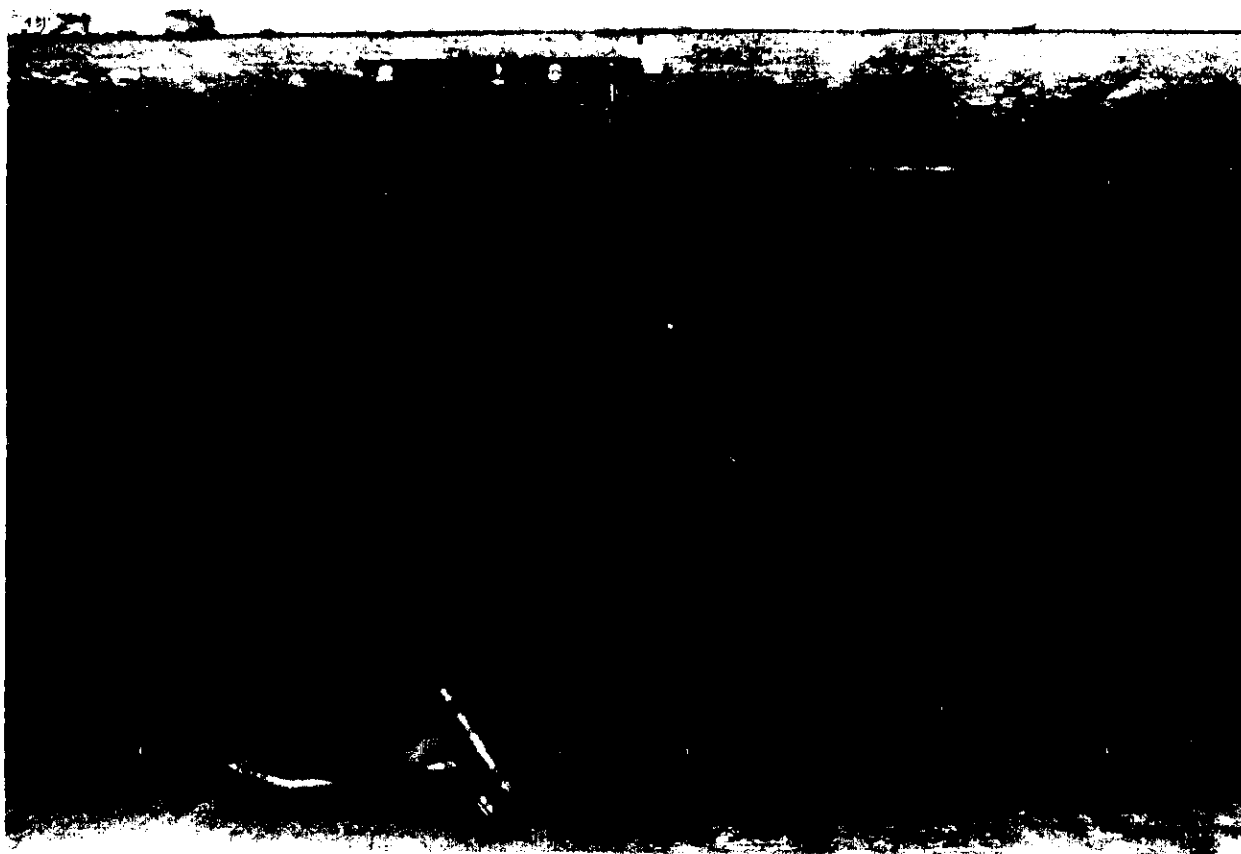


46°32'46"  
119°07'58"

099948-38CN  
(PHOTO TAKEN 1982)

## TANK F15 AND TANK F16

Pipe Tunnel Wall

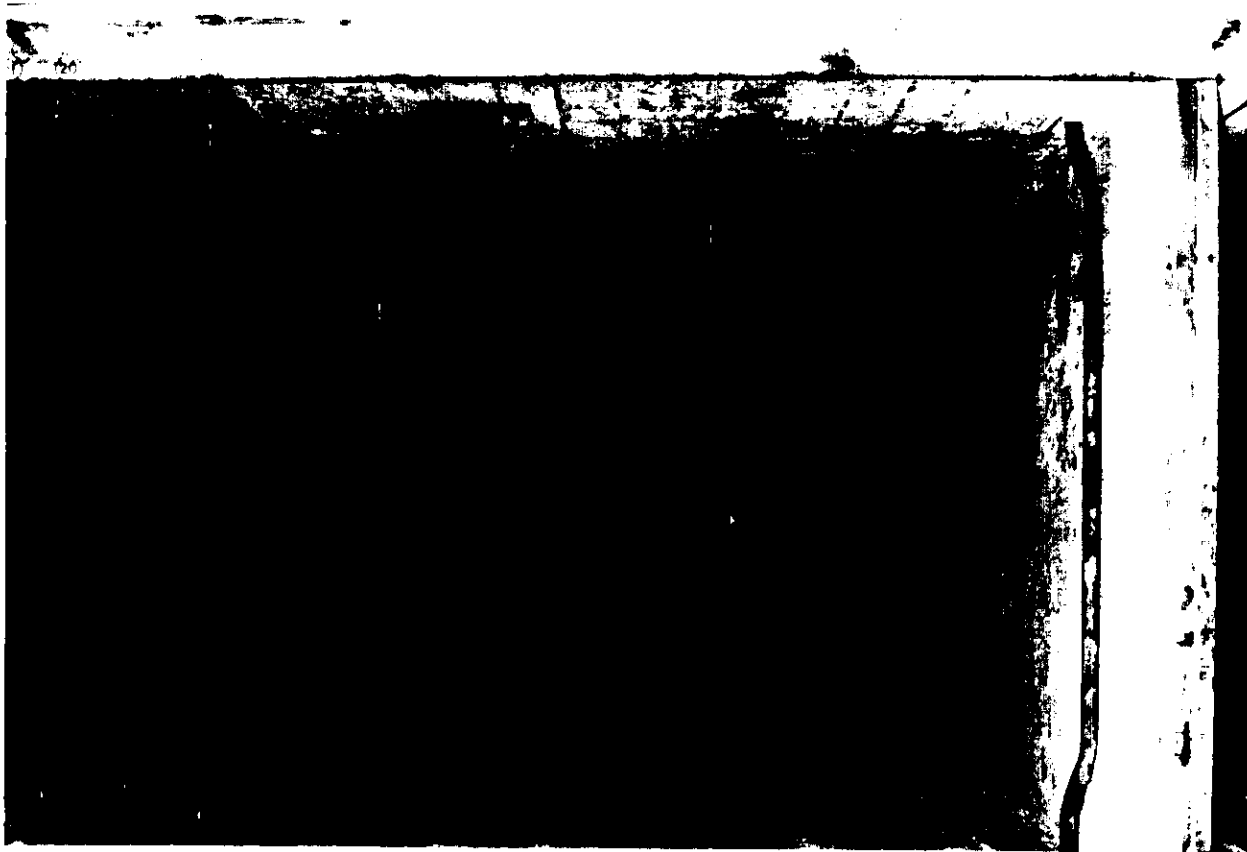


46°32'46"  
119°08'00"

099948-71CN  
(PHOTO TAKEN 1982)

# TANK F18

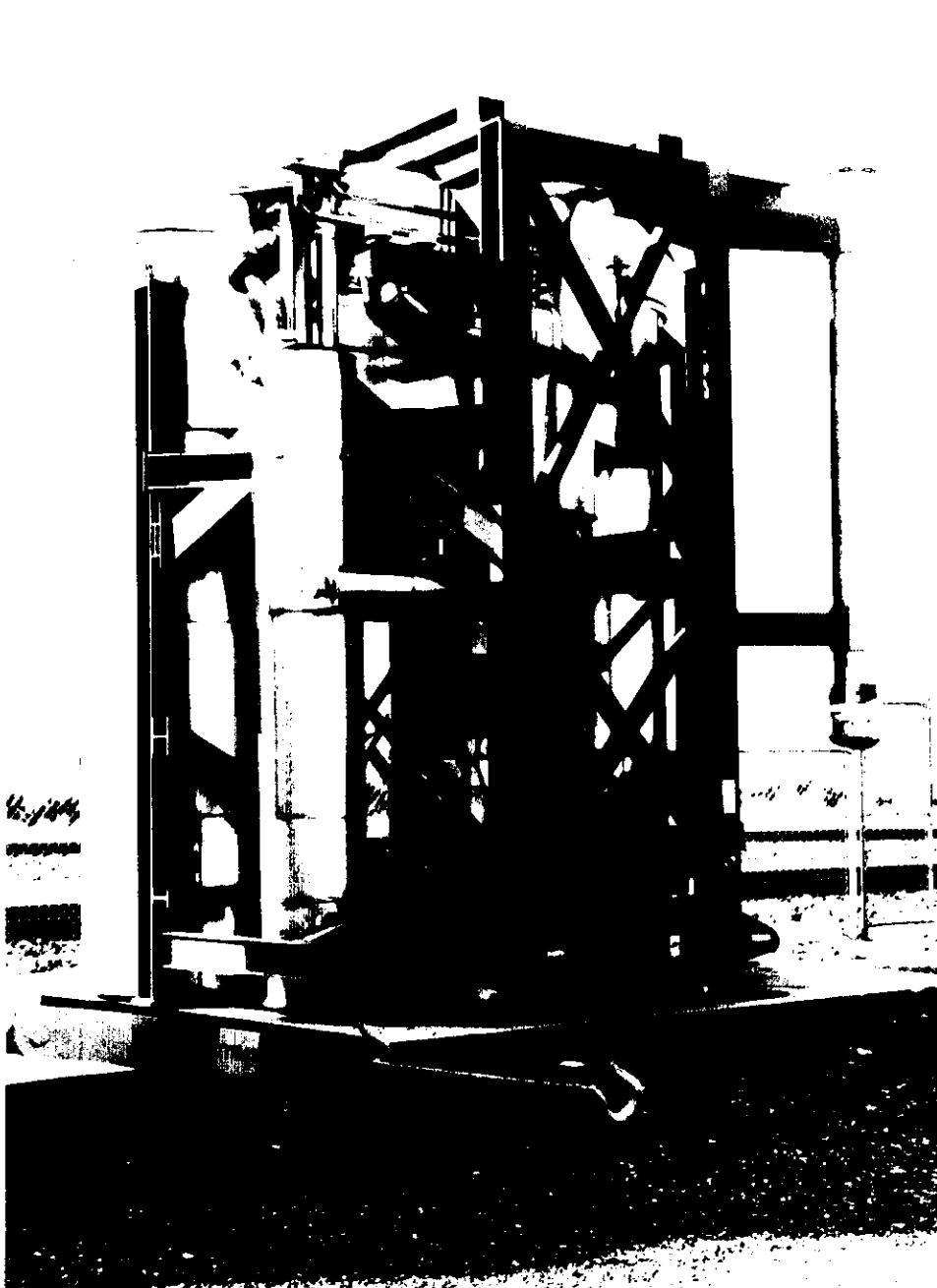
Pipe Tunnel Wall



46°32'46"  
119°08'01"

099948-74CN  
(PHOTO TAKEN 1982)

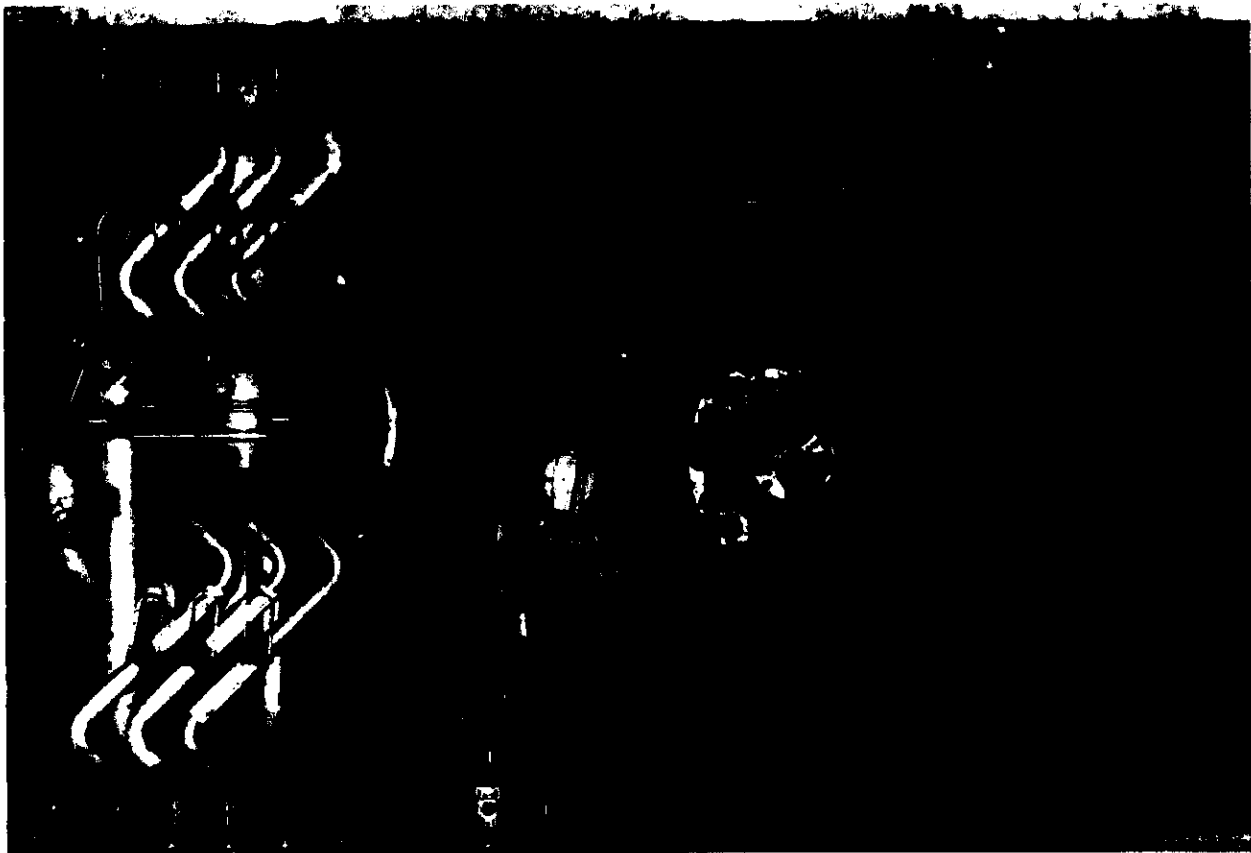
## E-F11 CONCENTRATOR



8706243-8CN  
(PHOTO TAKEN 1987)

## E-F11 CONCENTRATOR

Pipe Tunnel Wall

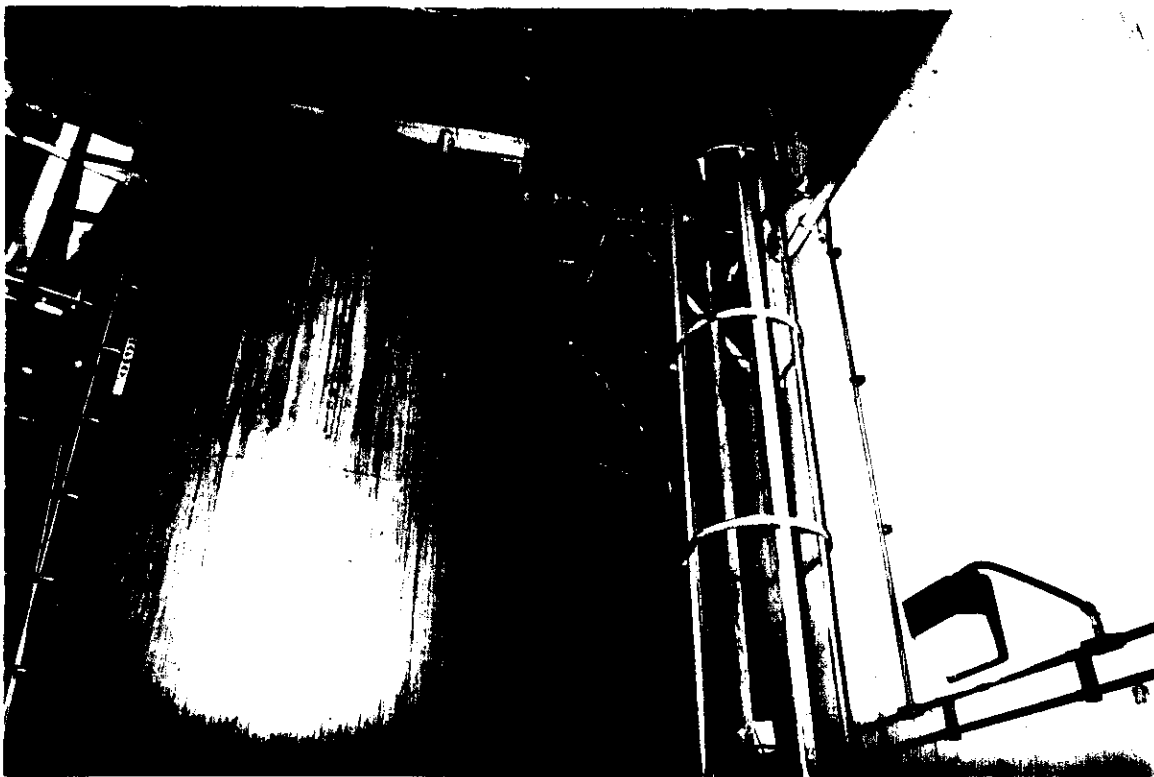


46°32'46"  
119°07'59"

099948-64CN  
(PHOTO TAKEN 1982)

## U CELL

Top of Tank U3 (Typical of Tank U4)



46°32'48"  
119°07'56"

92102839-10CN  
(PHOTO TAKEN 1992)

## U CELL

Bottom of Tanks

Tank U3

Tank U4



46°32'48"  
119°07'56"

92102839-7CN  
(PHOTO TAKEN 1992)



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Subject: HANFORD FACILITY DANGEROUS WASTE PART A PERMIT APPLICATION FORM 3,  
REVISION 4, FOR THE PLUTONIUM-URANIUM EXTRACTION PLANT (WA7890008967)  
(TSD: TS-2-6)

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